Chevrolet S-10 EV - Battery upgrade to BMW i3 modules

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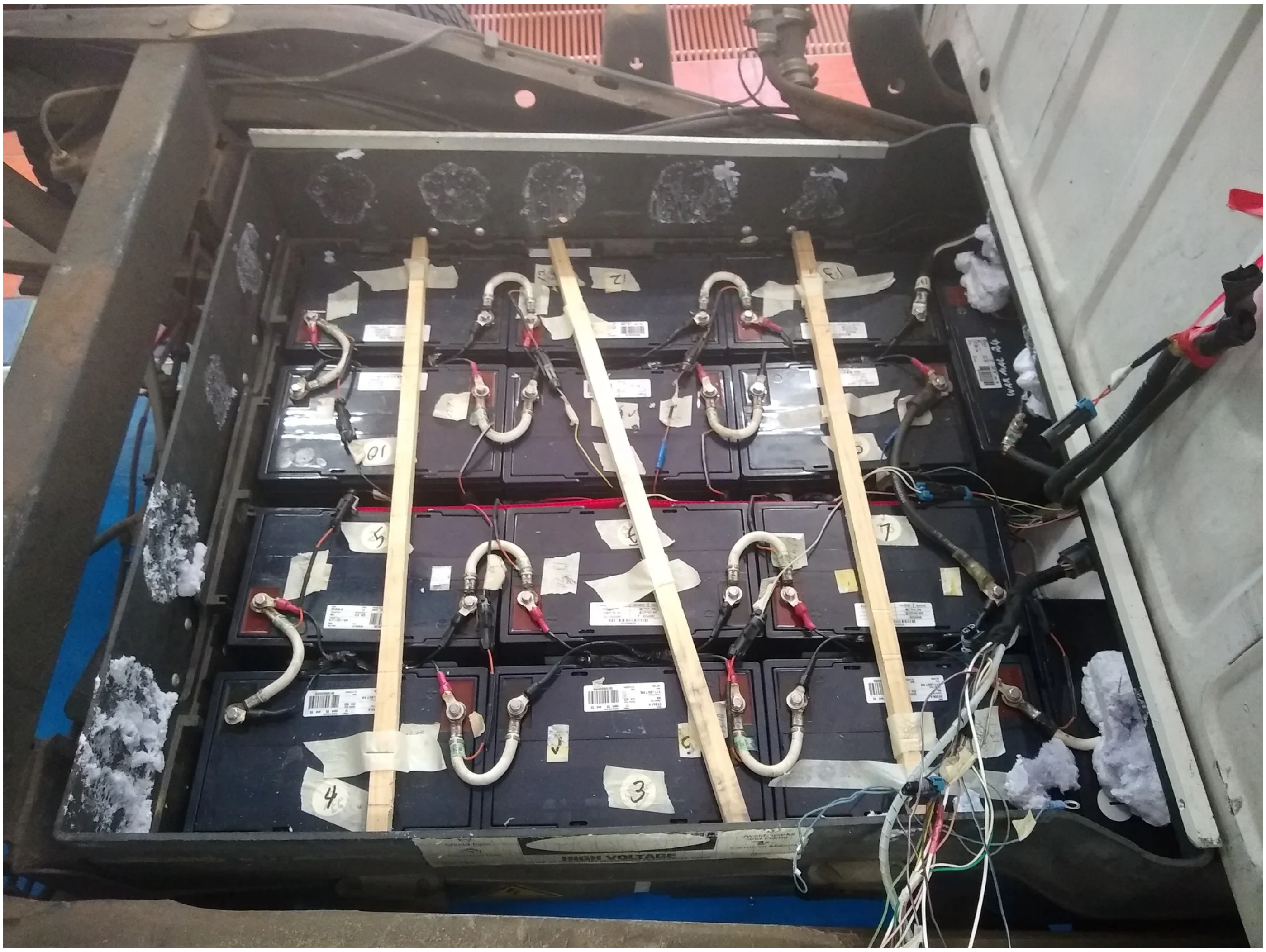
J **julwaech** · Registered
Joined Aug 25, 2016 · 9 Posts

Discussion Starter · #1 · 4 mo ago

Hello friends,
i purchased the Chevrolet S-10 EV from bjnkm2: [For Sale, 1997 Chevrolet S10Electric, $8K OBO]

After the long shipping of the car, the lead acid battery was completely empty and a few cells did not catch up to a good capacity after recharge. We decided to make a conversion to lithium ion batteries and to use 120ah bmw i3 modules for that. They are a good fit and it's easy to work with them.


12
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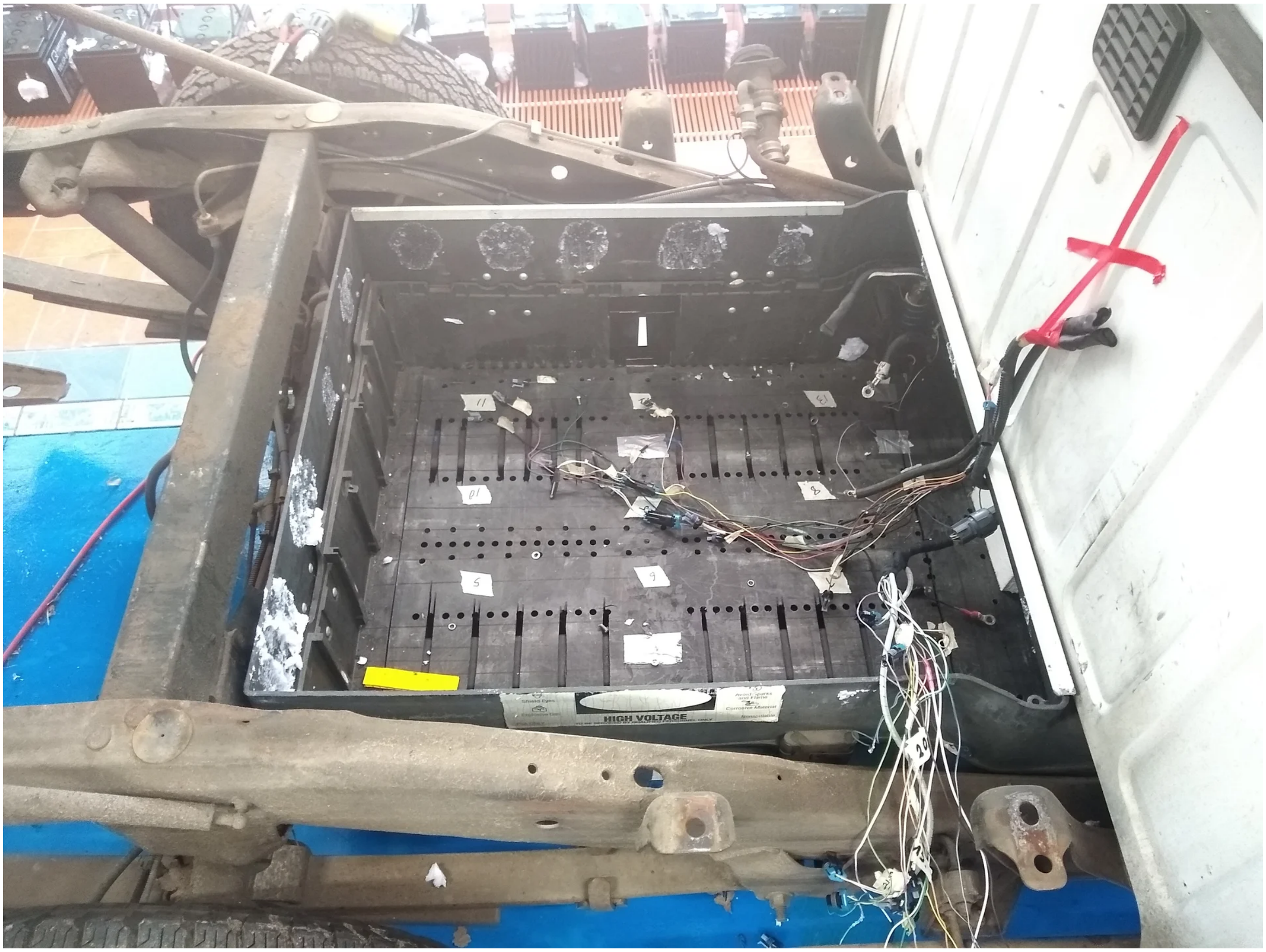
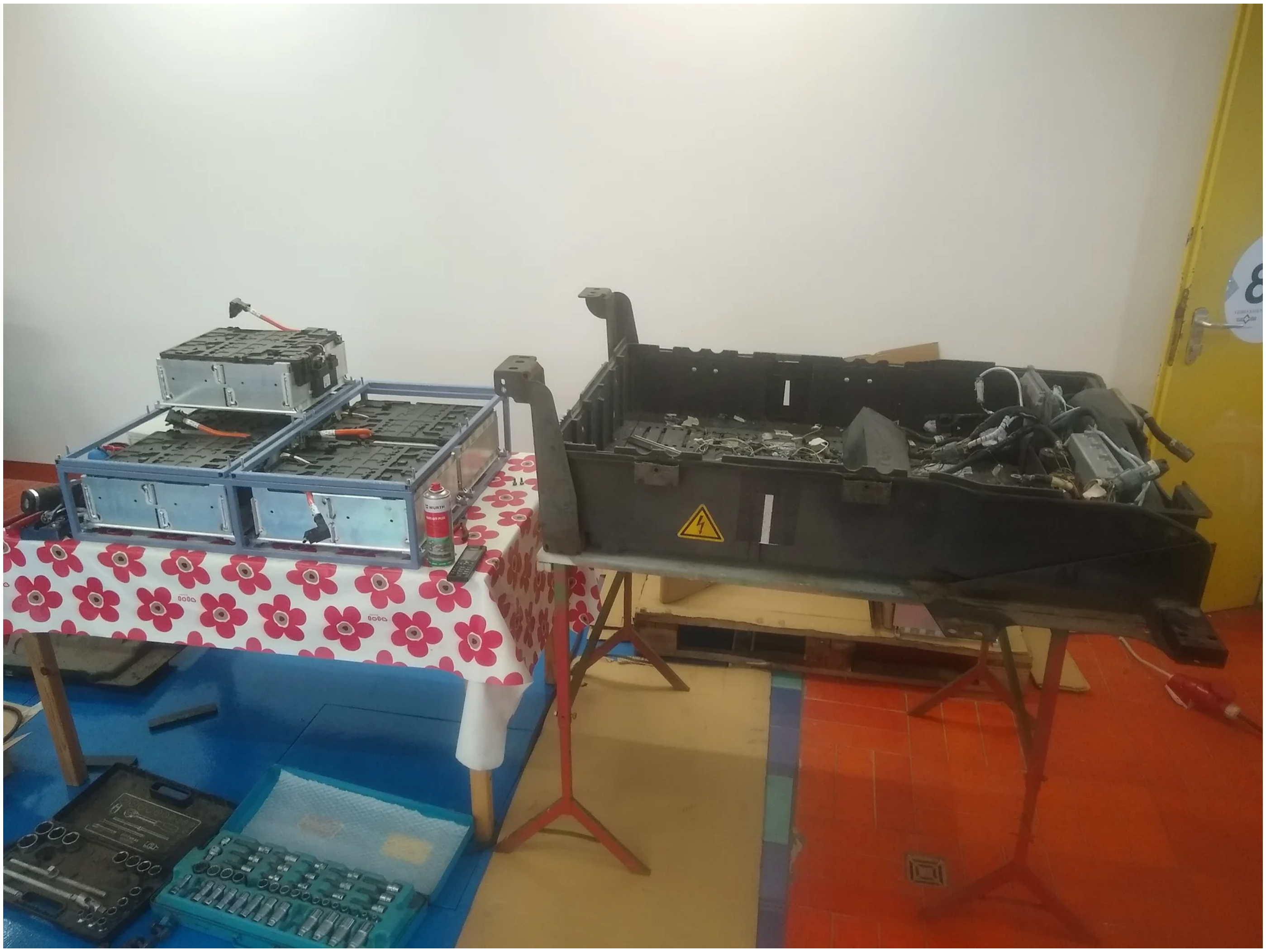
HIGH VOLTAGE

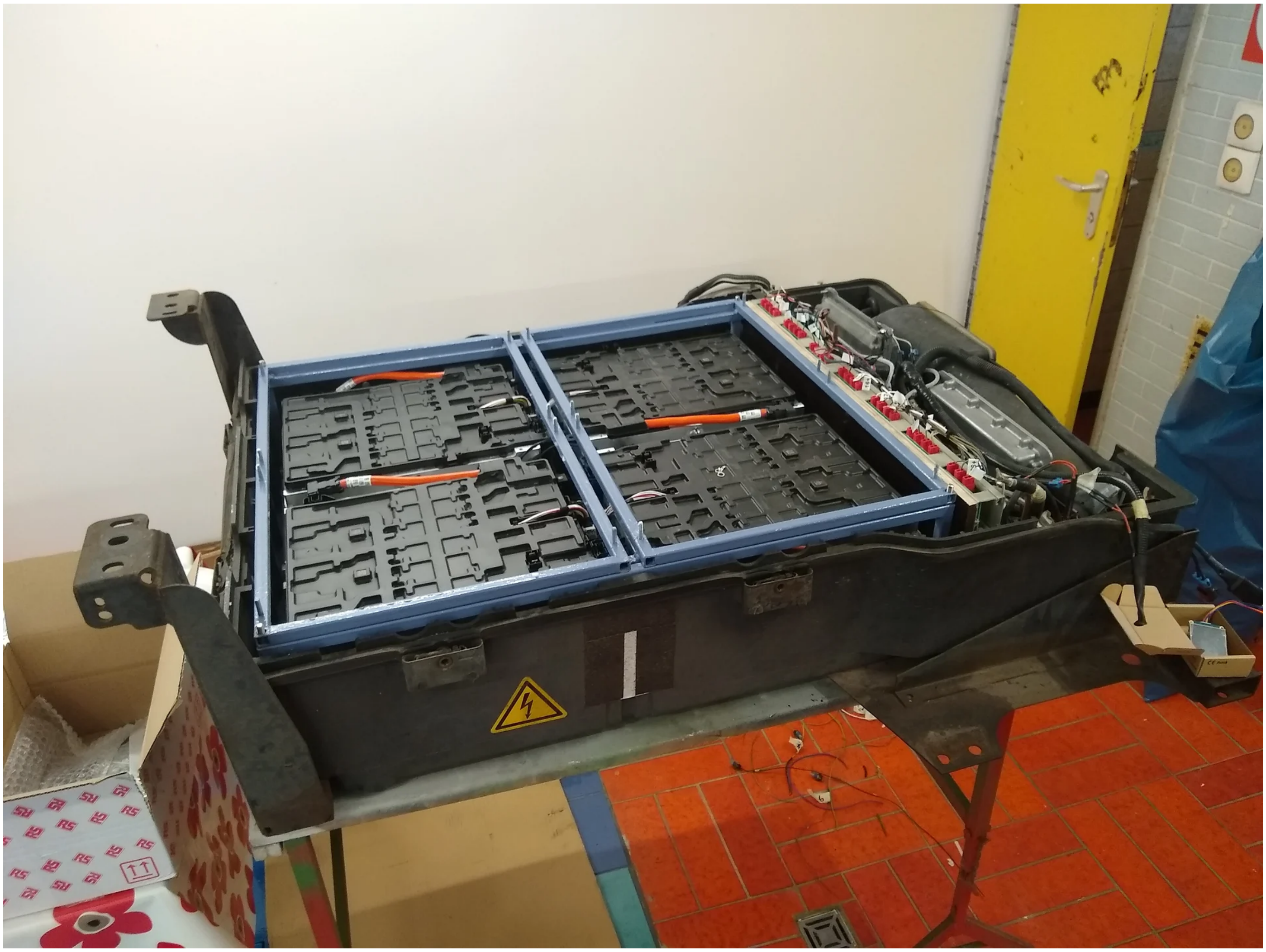
-bottom layer of lead acid batteries



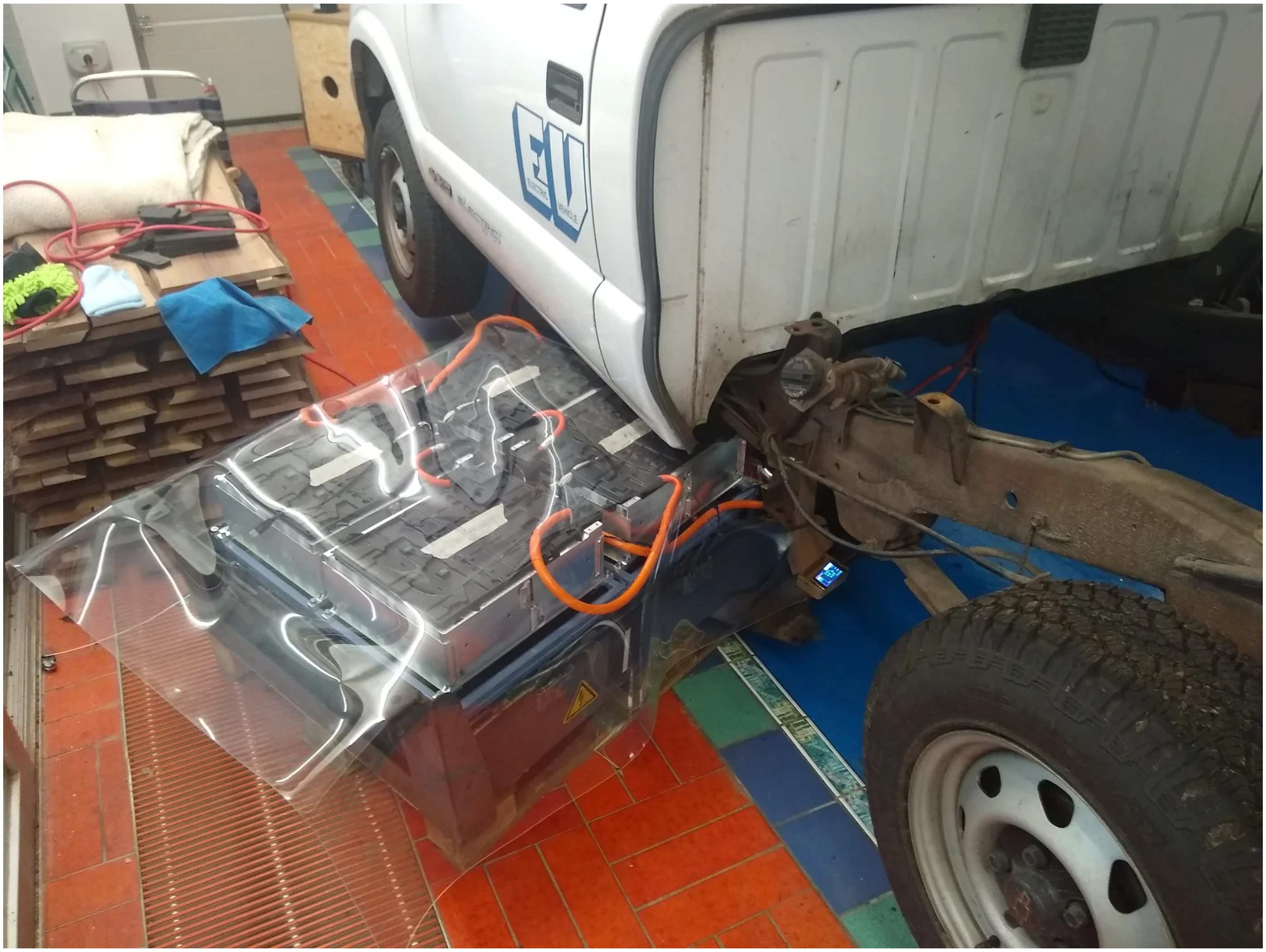
-empty battery case



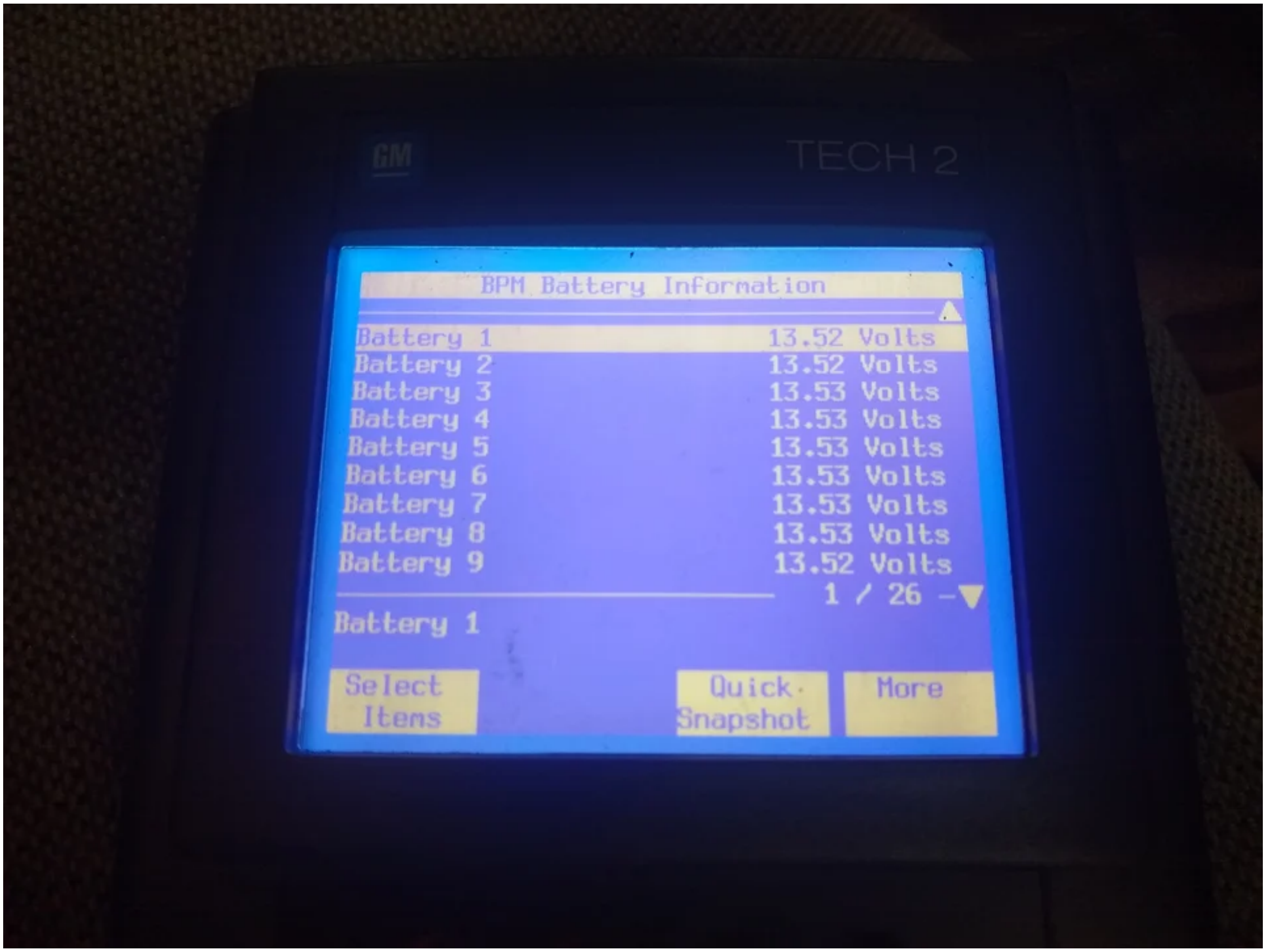
-preparing for swap



-first layer of bmw i3 modules. The red connectors on the right side are from the bms wires. They are only connecting to resistors, to fool the chevrolet bms into thinking everything is alright. We used the simpBMS from tomdebree to monitor the i3 modules and used an additional contactor for safety reasons. We still use the original magna charger. The chevrolet bms still receives the overall voltage of the bmw modules (and also overall voltage divided by 26 for every original lead acid battery)



-testing before final installation



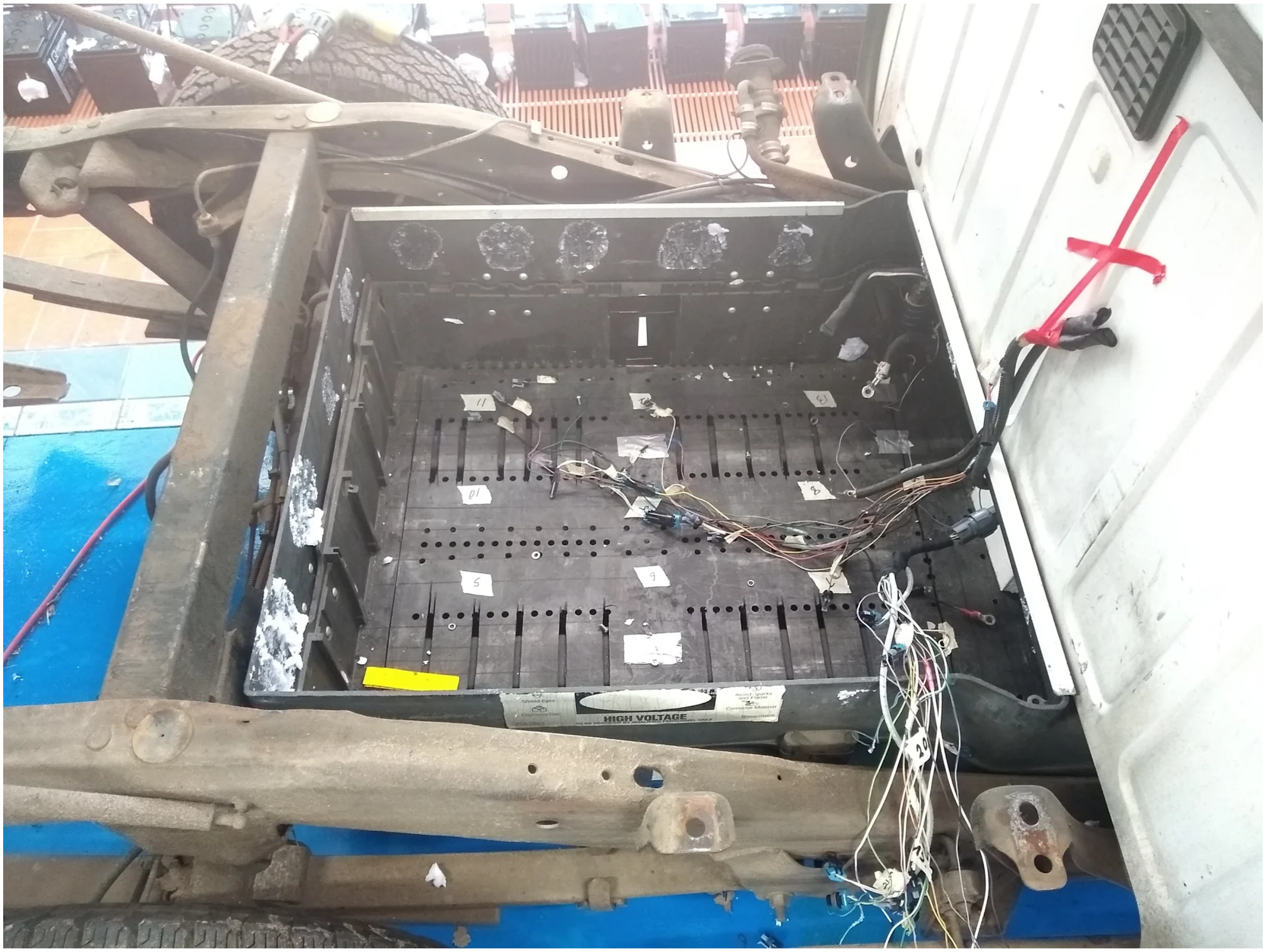
```
BPM Battery Information
Battery 1                 13.52 Volts
Battery 2                 13.52 Volts
Battery 3                 13.53 Volts
Battery 4                 13.53 Volts
Battery 5                 13.53 Volts
Battery 6                 13.53 Volts
Battery 7                 13.53 Volts
Battery 8                 13.53 Volts
Battery 9                 13.52 Volts
                               1 / 26
Battery 1
```

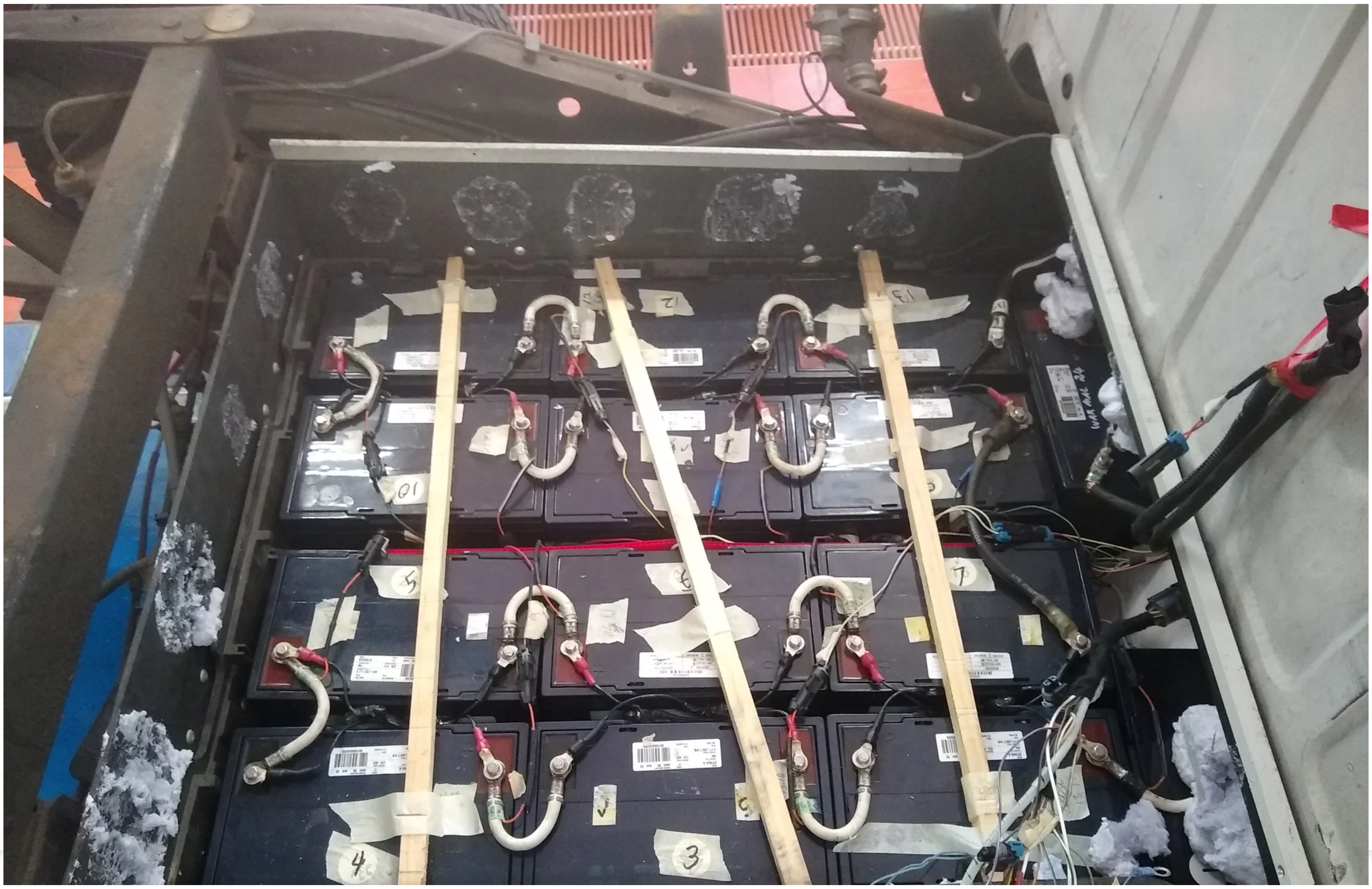
-overall voltage divided by 26

EV
ELECTRIC
The Future is ELECTRIC

-S-10 put to work

The truck is now 200kg lighter and is doing 100+ miles per charge. Acceleration improved to 7.2s for 0-50mph. If you have any questions i will try my best to answer them!


HIGH VOLTAGE



reiderM · Registered
Joined 4 mo ago · 151 Posts

#2 · 4 mo ago

Cool! I'm planning on using a similar amount of batteries for a SUV conversion so I would love to know the full range. When you say 100+, what specifically do you mean?

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J **julwaech** · Registered
Joined Aug 25, 2016 · 9 Posts

Discussion Starter · #3 · 4 mo ago

> reiderM said:
>
> Cool! I'm planning on using a similar amount of batteries for a SUV conversion so I would love to know the full range. When you say 100+, what specifically do you mean?

It's not significant more than 100 miles, maybe 110. You might even get less miles if its a big SUV you are converting. Also the the S-10 appears to be power consuming with the electric heater for the battery pack and cabin. It's also not shutting down completely and draining the battery over time. It feels like its a little bit too much energy which is lost during parking.

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ever · Registered

Joined 5 mo ago · 7 Posts

#4 · 2 mo ago

This is awesome. Thank you for sharing!

I have similar Samsung SDI Modules that I am trying to install in my S10 EV. I am monitoring them with an Orion BMS.

I have some questions regarding the "Sppofing" of the BPCM.

> They are only connecting to resistors, to fool the chevrolet bms into thinking everything is alright.

Can you explain this in more detail? I am trying to replicate it myself

It is my understanding that the S10 EV BPCM was set up to track 26 batteries (either PbA @ 12v or NiMH @ 13.2v) and the total voltage (either PbA @ 312 v or NiMh @ 343v). It also included temperature sensors.

Did you use resistors to spoof the temp sensors? If so, which ones?

How did you divide the voltage of the pack by 26?

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reiderM · Registered
Joined 4 mo ago · 151 Posts

#5 · 2 mo ago

> ever said:
>
> I have some questions regarding the "Sppofing" of the BPCM.
>
> Can you explain this in more detail? I am trying to replicate it myself

My guess is that he is using resistors to decrease the voltage that the BMS receives from the cells to make the cell voltage readings to line up with the original lead-acid cells. It's a clever solution.

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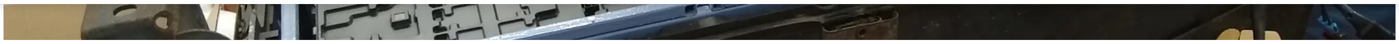

ever · Registered
Joined 5 mo ago · 7 Posts

#6 · 2 mo ago

> reiderM said:
>
> My guess is that he is using resistors to decrease the voltage that the BMS receives from the cells to make the cell voltage readings to line up with the original lead-acid cells. It's a clever solution.

Close but not quite.

The total pack voltage is in line with what the BMS is expecting. There were 26 x 12v modules originally. So he divides the total voltage by 26 to feed it to each battery sensor. This can be done with a voltage divider.

He is also sending in a signal to the temperature sensors on the BMS using resistors it sound like.

👍 reiderM

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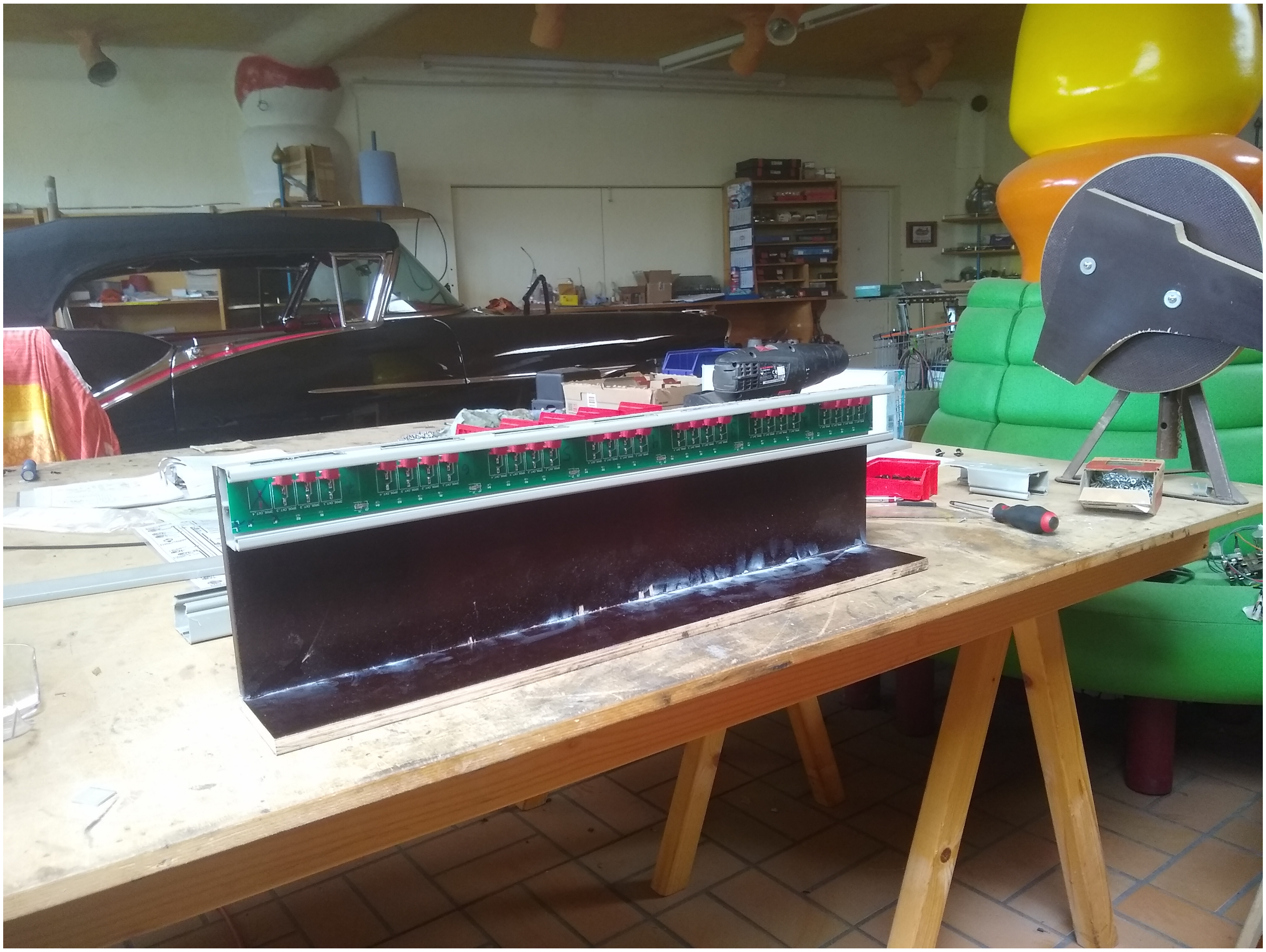
J **julwaech** · Registered
Joined Aug 25, 2016 · 9 Posts

✓ Discussion Starter · #7 · 2 mo ago

Hi, sorry for the late reply.

> ever said: ⊕
>
> Did you use resistors to spoof the temp sensors? If so, which ones?

I made a row of small pcbs with smd resistors and connectors. I think i used 4.7k resistors. You can also use higher resistance values.
Here is a picture of the pcbs.



Next time i would create one small pcb with one suitable connector that can handle the voltage.

> ever said: ⊕
>
> He is also sending in a signal to the temperature sensors on the BMS using resistors it sound like.

I did not change the temperature sensors. They were just placed somewhere in the battery box and not fixed to cells or something like this.

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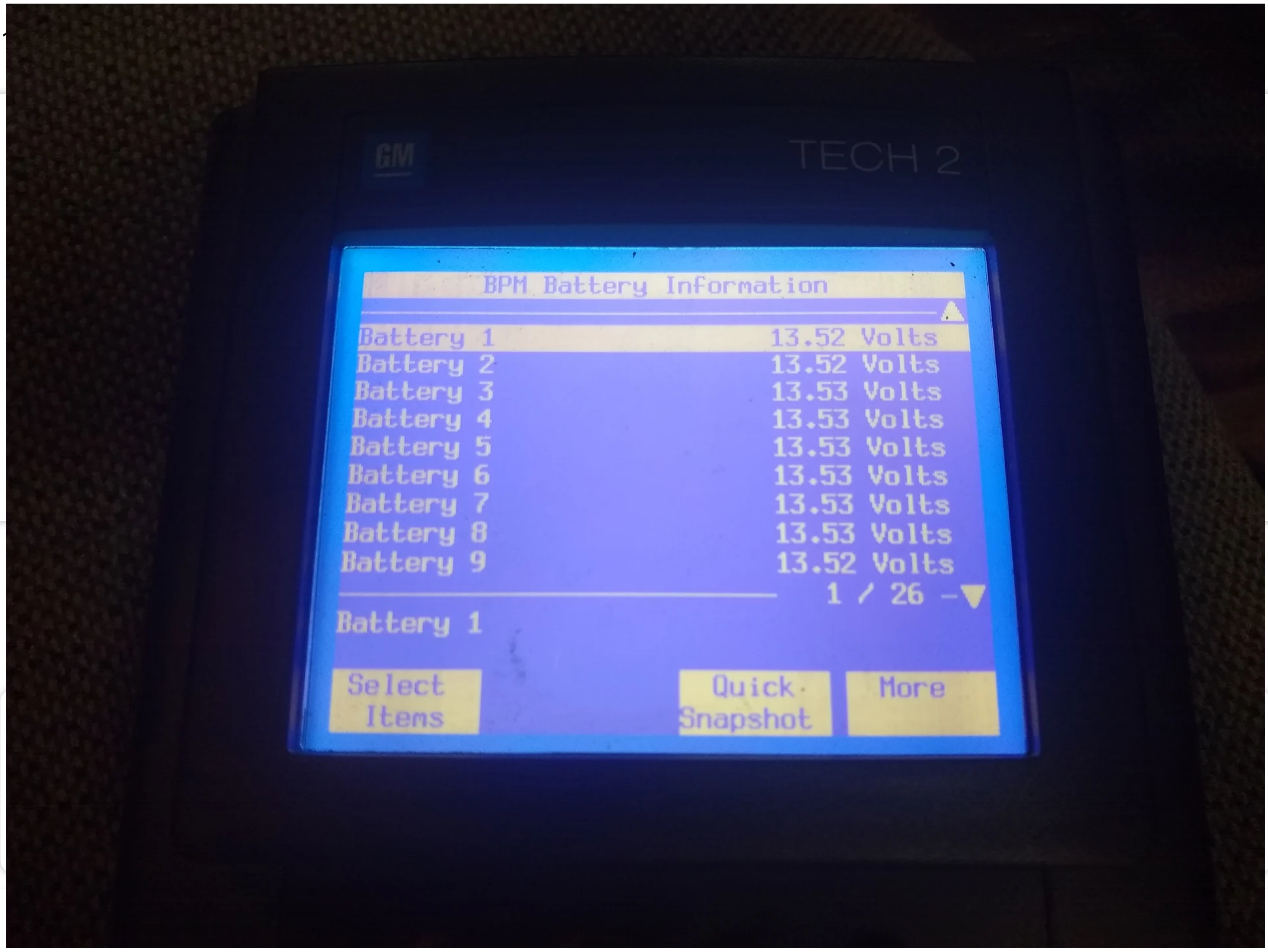

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Battery 5          13.53 Volts
Battery 6          13.53 Volts
Battery 7          13.53 Volts
Battery 8          13.53 Volts
Battery 9          13.52 Volts
                        1 / 26
Battery 1
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Batteries and Charging

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240 volt relay... Need help finding one.

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